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EXAMINER

ANDUJAR, LEONARDO

ART UNIT

PAPER NUMBER

2826

DATE MAILED: 11/20/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	09/822,944	
Examiner	Art Unit	
Leonardo Andújar	2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.

- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 29 August 2002.

2a) This action is **FINAL**. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-3,5-12 and 14-18 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 1-3,5-12 and 14-18 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) Notice of References Cited (PTO-892)
2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.

4) Interview Summary (PTO-413) Paper No(s) _____.
5) Notice of Informal Patent Application (PTO-152)
6) Other: _____.

DETAILED ACTION

Acknowledgment

1. The amendment filed on 08/29/2002, paper no. 8 has been entered. The present Office action is made with all the suggested amendments being fully considered. Accordingly, pending in this Office action are claims 1-3, 5-12 and 14-18.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claim 16 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification does not contain any disclosure regarding "an integrated circuit selected from the group consisting of printable circuit board, aluminum lead frames, and fine pitch ball grid arrays".

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 16 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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6. While applicant may be his or her own lexicographer, a term in a claim may not be given a meaning repugnant to the usual meaning of that term. See *In re Hill*, 161 F.2d 367, 73 USPQ 482 (CCPA 1947). The term "integrated circuit" in claim 16 is used by the claim to mean "substrate," while the accepted meaning is "a tiny slice or chip of material on which is etched or imprinted a complex of electronic components and their interconnections." Although integrated circuit chips may be recognized as substrates not all substrates are recognized as integrated circuits e.g. lead frames.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

8. The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

9. Claims 11, 12 and 14 are rejected under 35 U.S.C. 102(e) as being anticipated by Horiuchi et al. (US 6,084,295).

10. Regarding claim 11, Horiuchi (e.g. figs. 1-3) shows an integrated circuit assembly comprising:

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- An integrated circuit 10;
- A substrate 5;
- A bond wire 20 connected to the integrated circuit and the substrate;
- And a polymer insulating material 30 coating the wire bond.

11. Regarding claim 12, Horiuchi shows that the substrate 5 is a printed circuit board (co. 3/ll. 32).

Regarding claim 14, Horiuchi discloses that the bond wire is made of gold (col. 4/lls. 26-37).

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 1-3 and 5-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horiuchi et al. (US 6,084,295).

14. Regarding claim 1, Horiuchi (e.g. figs. 1-3) shows an apparatus comprising:

- A bond wire 20;
- An insulating material 30 coating the wire bond;
- And a first end of the wire bond connected to a bond pad.

15. Horiuchi shows most aspects of the instant invention (see comments above), except for the specific insulating coating thickness claimed by the applicant i.e., the thickness of the insulating material on the bond wire is in the range of approximately 0.2

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micrometers to 0.6 micrometers. Horiuchi, however, discloses that the thickness of the bond wire is 5 micrometers (col. 4/lls. 26-37). Although Horiuchi does not specify the same insulating thickness as those claimed by the applicants, thickness differences are considered obvious design choices and are not patentable unless unobvious or unexpected results are obtained from these changes. Accordingly, it would be an obvious matter of design choice to select a suitable thickness for the insulating coating disclosed by Horiuchi, since the insulating thickness is variable of importance subject to routine experimentation and optimization and it is not inventive to discover the optimum or workable ranges by routine experimentation. In re Aller, 220 F.2d 454, 105 USPQ 233, 235. Furthermore, it appears that the insulating differences between Horiuchi and the claimed invention produce no functional differences and therefore would have been obvious. Note In re Leshin, 125 USPQ 416.

16. Regarding claim 2, Horiuchi discloses that the bond wire is made of gold (col. 4/lls. 26-37).

17. Regarding claim 3, Horiuchi discloses that the insulating material comprises a polymer (col. 4/lls. 26-37).

18. Applicant's claims 5, does not distinguish over the Horiuchi reference regardless of the process used to connect the wire bond to the bond pad, because only the final product is relevant, not the process of making such ultrasonic bonding. Note that a "product by process" claim is directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186

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USPQ 161; *In re Wertheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and *In re Marosi et al.*, 218 USPQ 289, all of which make it clear that it is the patentability of the final product *per se* which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that applicant has the burden of proof in such cases, as the above caselaw makes clear. See also MPEP 706.03(e).

19. Regarding claim 6, Horiuchi shows that the bond pad is connected to an integrated circuit (abstract).

20. Regarding claim 7, Horiuchi shows that the bond pad is connected to a substrate (e.g. fig. 1).

21. Regarding claim 8, Horiuchi (e.g. figs. 1-3) shows an apparatus comprising:

- A first bond wire 20;
- An insulating material (30 and 32) coating the wire bond;
- A first end of the wire bond connected to a bond pad;
- And a second bond wire crossing the first bond wire.

22. In the instant case the insulating resin 32 coats the first end of the wire bond whereas the remainder area is coated by the epoxy 30. Applicant's claims 8, does not distinguish over the Horiuchi reference regardless of the process used to connect the wire bond to the bond pad, because only the final product is relevant, not the process of making such as "*connecting the first end to the bond pad by ultrasonic bonding without previously removing the insulating from the first end*". Note that a "product by process"

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claim is directed to the product per se, no matter how actually made, *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wertheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and *In re Marosi et al.*, 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that applicant has the burden of proof in such cases, as the above caselaw makes clear. See also MPEP 706.03(e).

23. Regarding claim 9, Horiuchi shows that the wires comprises an insulating material coating the second wire bond (e.g. fig. 3).

24. Regarding claim 10, Horiuchi shows that the first bond wire touches the second bond wire (e.g. fig. 1).

25. Claims 15-18, are rejected under 35 U.S.C. 103(a) as being unpatentable over Horiuchi et al. (US 6,084,295) in view of Takiar (US 5,422,435)

26. Regarding 15, Horiuchi (e.g. figs. 1-3) shows an integrated circuit assembly comprising:

- An integrated circuit 10;
- A substrate 5;
- A bond wire 20 connected to the integrated circuit and the substrate;
- And an insulating material 30 coating the wire bond.

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27. Horiuchi shows most aspects of the instant invention (see comments above), except for the specific insulating coating thickness claimed by the applicant i.e., the thickness of the insulating material on the bond wire is in the range of approximately 0.2 micrometers to 0.6 micrometers. Horiuchi, however, discloses that the thickness of the bond wire is 5 micrometers (col. 4/lls. 26-37). Although Horiuchi does not specify the same insulating thickness as those claimed by the applicants, thickness differences are considered obvious design choices and are not patentable unless unobvious or unexpected results are obtained from these changes. Accordingly, it would be an obvious matter of design choice to select a suitable thickness for the insulating coating disclosed by Horiuchi, since the insulating thickness is variable of importance subject to routine experimentation and optimization and it is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Aller*, 220 F.2d 454, 105 USPQ 233, 235. Furthermore, it appears that the insulating differences between Horiuchi and the claimed invention produce no functional differences and therefore would have been obvious. Note *In re Leshin*, 125 USPQ 416. However, Horiuchi does not disclose a second integrated circuit. Takiar (e.g. fig. 5) shows a package comprising a first integrated circuit connected to a second integrated circuit by bond wires. Takiar discloses that this type of embodiment provides a single circuit assembly. Furthermore, Takiar discloses that this type of arrangement is used to decrease the size and weight of the device, as well as to improve its performance (col. 2/lls. 3-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a

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second integrated circuit in Horiuchi's invention in order to provide a single circuit assembly having a decreased size and weight as suggested by Takiar.

28. Regarding claim 16 (as understood), Horiuchi shows that the substrate 5 is a printed circuit board (col. 3/ll. 32).

29. Regarding claim 17, Horiuchi discloses that the insulating material comprises a polymer (col. 4/lls. 26-37).

30. Regarding claim 18, Horiuchi discloses that the bond wire is made of gold (col. 4/lls. 26-37).

Response to Arguments

31. Applicant's arguments filed 08/29/2002 have been fully considered but they are not persuasive. Applicant argues that the thickness differences between the claimed range and the prior art cannot be considered an obvious design choice since is not a "small difference." Nevertheless, Applicant fails to provide evidence showing that these changes provide unobvious or unexpected results. Also, Applicant fails to show that the difference in insulating thickness between Horiuchi and the claimed invention produce functional differences.

32. Applicant states "*If the Examiner continues to reject this limitation, Applicant respectfully request the Examiner to provide a reference showing a thickness in the disclosed range*". However, the Examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one

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of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the insulating thickness is variable of importance subject to routine experimentation and optimization and it is not inventive to discover the optimum or workable ranges by routine experimentation. Note that the device's miniaturization is one of the main objective of the semiconductor industry. Therefore, it is not necessary to provide a reference showing a thickness in the discloses range to establish the *prima facie* case of obviousness. Nevertheless, this range is known in the art as evidenced by Tanaka (see the tabulated description).

33. Applicant's claims 8, does not distinguish over the Horiuchi reference regardless of the process used to connect the wire bond to the bond pad, because only the final product is relevant, not the process of making such ultrasonic bonding. Note that a "product by process" claim is directed to the product *per se*, no matter how actually made, *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wertheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and *In re Marosi et al.*, 218 USPQ 289, all of which make it clear that it is the patentability of the final product *per se* which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that applicant has the burden of proof in such cases, as the above caselaw makes clear. See also MPEP 706.03(e).

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34. Applicant argues that Horiuchi does not disclose that the insulating material comprises a polymer. Nonetheless, Horiuchi clearly discloses that the insulating layer comprises an epoxy (col. 4/lls. 26-37). The term epoxy is defined as any of various usually thermosetting resins capable of forming tight cross-linked polymer structures characterized by toughness, strong adhesion, and low shrinkage, used especially in surface coatings and adhesives.ⁱⁱ

Conclusion

35. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

36. Papers related to this application may be submitted directly to Art Unit 2826 by facsimile transmission. Papers should be faxed to Art Unit 2826 via the Art Unit 2826 Fax Center located in Crystal Plaza 4, room 3C23. The faxing of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (15 November

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1989) The Art Unit 2826 Fax Center number is **(703) 308-7722** or **-7724**. The Art Unit 2826 Fax Center is to be used only for papers related to Art Unit 2826 applications.

37. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Leonardo Andújar** at **(703) 308-0080** and between the hours of 9:00 AM to 7:30 PM (Eastern Standard Time) Monday through Thursday or by e-mail via Leonardo.Andujar@uspto.gov. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn, can be reached on (703) 308-6601.

38. Any inquiry of a general nature or relating to the status of this application should be directed to the **Group 2800 Receptionist** at **(703) 305-3900**.

39. The following list is the Examiner's field of search for the present Office Action:

Field of Search	Date
U.S. Class / Subclass (es): 257/723, 782 and 786	11/02
Other Documentation:	11/02
Electronic Database(s): East (USPAT, US PGPUB, JPO, EPO, Derwent, IBM TDB)	

Leonardo Andújar

Patent Examiner Art Unit 2826

LA

11/5/02

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